

## INDUSTRY

### GOLD REFINING PLANT CONSTRUCTION INVESTMENT PROJECT



Armenia is rich with various minerals and fossils. There are more than 500 sites in Armenia that are rich with more than 60 types of minerals (copper, molybdenum, iron, zinc, nepheline syenite mine, lead, mercury, arsenic, scandium, vanadium, etc.).

Armenia is also rich with gold, silver and platinum mines. The largest operating mines are Zod and Meghradzor. Gold reserves amount in gold-sulphide mines reaches 247 tons, meanwhile the same amount of anticipated resources mines reaches 351 tons.

The process of gold refining can be carried out by chemical, electrochemical so-called Miller method.

The chemical method is used applying to iron sulphate, nitric and hydrochloric acid. It can also be used in case of small quantity refinement and the



electrochemical method is expedient to be applied in the case of large-scale and continuous processes, when refined material has no less than 900 fineness with low silver content.

The refinement using Miller method is carried out by means of contacting gold containing material with chlorine gas referring to more than 700 fineness high-purity gold and high content of silver.

The selection of the listed gold refining technologies can be done based on the features of "Dore" alloy that is used as a raw material for refinement.

Currently there are some gold refining capacities, that can refine no more than 4 tons of gold by chemical method.

They are the following:

- **"Assat" LLC**, located in the Masis town, Ararat region. The enterprise has an annual refining capacity of 1.5-2 tons of gold, as well as mining concentration plant.
- **"Gold Factor" LLC**, based in Yerevan. The company has a license issued by the Ministry of Finance of Republic of Armenia for refining precious metals and

producing bank gold and standard bullions, manufacturing bank gold and license  
The company's capacity allows to refine 2 tons of gold per year.

- **Purpose**

The close of the value chain and the acquisition of higher value-added through the expansion of gold processing extracted in Armenia (as a result of refining "Dore" type of gold alloy), which would enable to produce standard bank gold bullions of 999.9 fineness.

- **Obstacles**

- Lack of strong gold refining plant,
- Necessity of the international certification for standard bank gold bullions

**Project attractiveness (relevance)**

Currently there are 8 gold mines operating in Armenia (14 mines are still under explorarion). The largest of them is Sotk mine, which is now operated by "GeoProMining Gold" company and produces around 4.2 tons gold in "Dore" type alloy (in 2015 it will reach 4.7 tons).

As a result of an investment project implementation by "Lydian International" company, 10-12 tons of gold alloys will be produced in Armenia in 2017, which makes expedient the construction of the gold affinage plant in Armenia.

In 2013 Armenia imported 3.8 tons of gold, which was mainly used in the production of jewelry or for sale as bank bullions.

According to the Strategy of Export-Led Industrial Policy approved by the Government of Armenia, jewelry was identified as a priority sector (from the perspective of export potential), in terms of which, in 2013 jewelry, watchmaking and diamond-cutting strategy



and a three-year appropriate action plan were approved. It supposes an implementation of such actions and support toolkit by the state that will affect on significant increase of production volumes resulting increase of demand for gold bullions.



The free economic zone operating in Armenia will also contribute to significant growth in gold consumption in the country. Taking into account a long-term increase of demand for gold and considering annual 6-7 tons of gold as an internal demand in the domestic market, the refining

(affinage) of gold alloys in Armenia can be used in a production of bank gold bullions, simultaneously taking part in international trade.

Examining sectoral developments in the external market, it can be stated that during 2015-2020 continuous growth in consumption is expected in Asian developing countries (India, China, Middle East) up about 30% per year. In West, the jewelry products consumption growth is expected to be relatively small, about 5% per year on the average.

Taking into account the forecasted growth of gold demand (both internal and external), as well as the application of new capacities in gold mining in Armenia, it is expedient to carry out gold refining (affinage) process in Armenia.

Affinage is an extraction process of precious metals from other compounds. Affinage can be defined not only as an extraction process, but also as a certification of products and companies carrying out affinage. Gold mining companies not only produce refined gold, but also assure (certify) the weight and purity of the bullions produced by them.

To be recognized as an object of the international trade, bank gold bullions produced in Armenia will need to be certified ("London Good Delivery") by the international certification organization. For this purpose, it is necessary to cooperate with seven member investment banks of London clearing company (London Precious Metals Clearing Limited, LPMCL), which are the following: HSBC, JP Morgan, UBS, Barclays, Deutsche Bank and ScotiaMocatta.

- ***Scenarios and development trends***

Two scenarios of refinement are observed:

***Scenario 1.*** Construction of a powerful plant on the basis of the existing gold refining factory in Armenia ("Assat" LLC, Masis city) through equipping it.

***Scenario 2.*** Selection of the plant construction location and construction of a new gold affinage plant.



- **Market potential for company's products**

- Jewelry sector in Armenia can become a domestic market for consumption (about 5-7 tons per year),
- Consumption can be also done in a form of standard bank bullions via London Stock Exchange of precious metals,
- State Treasury.

- **Financial assessment of investments**

**According to preliminary estimates, the construction of the gold affinage plant with up to 20 tons capacity will require investments up to 10-12 million USD.**

International practice shows that affinage service cost is calculated at a rate of up to 1% of the value of the refined gold. That means, in case of refining 15 tons of gold, the annual turnover of the company will reach about 6.5 million USD and if done via the London Stock Exchange of precious metals, the company's profit will increase significantly.

- **Potential stakeholders**

The entities mentioned below are eligible to participate in the funding for the gold affinage plant construction:

- Interested gold mining companies
- Potential consumers (jewelry sector companies)
- Banks
- Sale of stock